Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application. Please cancel Claim 2 and amend Claims 1, 3, 4, 6, 9, 10, 11, 12, 13, 14, and 17 as presented below:

LISTING OF CLAIMS:

1) (Currently amended) A method for mapping the movement and position of a mobile agent using stand-off optical detection comprising:

a) transmitting a pulse of light at a first known time;

b) interacting said pulse of transmitted light with a mobile agent to generate a pulse of interacted light;

c) receiving said pulse of interacted light with a receiver optical system at an at least one later known time;

d) measuring an intensity of said pulse of interacted light with at least one photodetection system in a manner suitable for electronic data storage;

measuring a time interval between the transmitting of said pulse of transmitted light and the receiving of said pulse of interacted light;

e) storing said intensity measurements of said intensity and said time interval between the transmitting and the receiving as data;

f) repeating said interacting, receiving, measuring, and storing steps a plurality of times; and

g) comparing said stored intensity data by means of at least one change detection algorithm to map a location of said mobile agent in time and space.

2) (Cancelled)

3) (Currently amended) The method of claim 1 2 wherein the said receiving step is performed using a receiver optical system comprising a receiver telescope and at least one optical band-pass filter suitable for passing light that has interacted with the mobile

2

agent and wherein the at least one said photodetection system comprises at least one photodetector with gain and at least one digitizer to record the intensity of the pulse of interacted light.

4) (Currently amended) The method of claim 1 2 wherein the said receiving step is performed using a receiver optical system comprising a means for recording an image of an the area illuminated by the pulse of transmitted light. laser transmitter.

5) (Original) The method of claim 4 wherein said means for recording an image comprises a gated camera and lens system.

6) (Currently amended) The method of claim 1 2 wherein the mobile agent is a living organism.

7) (Original) The method of claim 6 wherein the mobile agent is a member of one of the taxonomic classes of insecta, crustacea, arachnida, osteichthyes, chondrichthyes, aves, and mammalia.

8) (Original) The method of claim 7 wherein the mobile agent is a member of the taxonomic order of hymenoptera.

9) (Currently amended) The method of claim 1 2 wherein the mobile agent is non-living.

10) (Currently amended) The method of claim 1 2 wherein the pulse of said interacted light is light elastically scattered from the mobile agent.

11) (Currently amended) The method of claim 10 wherein a wavelength of the pulse of said transmitted light is selected to minimize scattering from an aerosol or a gas molecule while maximizing a scattering reflectance from a mobile agent.

3

12) (Currently amended) The method of claim 1 2 wherein the mobile agent emits said the pulse of interacted light at a wavelength different from a the wavelength of the pulse of transmitted light.

13) (Currently amended) The method of claim 1 2 wherein a material adherent to the mobile agent emits said interacted light at a wavelength different from a the wavelength of said pulse of transmitted light.

14) (Currently amended) The method of claim 1 2 wherein said pulse of transmitted light comprises a collimated light beam and wherein said collimated light beam is translated laterally between a plurality of pulses to scan an area.

15) (Original) The method of claim 14 wherein said intensity of said pulse of interacted light is measured as a function of time since said known time of transmitting the transmitted pulse of light, thereby generating a time-and-intensity profile, and a distance to said mobile agent is calculated using said time-and-intensity profile.

16) (Original) The method of claim 15 wherein a plurality of said time-and-intensity profiles are compared using a change-detection algorithm to generate a multi-dimensional mapping of the location of said mobile agent.

17) (Currently amended) The method of claim 1 2 wherein said pulse of transmitted light comprises an uncollimated light beam illuminating an area wherein a location of said mobile agent is to be determined.

18) (Original) The method of claim 17 wherein said pulse of interacted light is received by a means for recording an image to generate a 2-dimensional image of said intensity of said interacted light at a plurality of times later than said pulse of transmitted light.

4

19) (Original) The method of claim 18 wherein said means for generating an image is selected from the group consisting of a CCD array, an intensified CCD array, a CID array, and an IR focal plane array.

20) (Original) The method of claim 18 wherein said intensity of said pulse of interacted light is measured as a function of time since said known time of transmitting the transmitted pulse of light, thereby generating a time-and-intensity profile, and a distance to said mobile agent is calculated using said time-and-intensity profile.

21) (Original) The method of claim 20 wherein a plurality of said time-and-intensity profiles are compared using a change-detection algorithm to generate a multi-dimensional mapping of the location of said mobile agent.

5